EPA Question #2: Environmental Monitoring Program

Shell Exploration & Production Company – Alaska Venture (Shell) developed the following response to address EPA's Question #2 on Shell's view of the Environmental Monitoring Program (EMP) requirements in the draft NPDES general permit for oil and gas geotechnical surveys (GGP) in the Alaska Arctic Beaufort and Chukchi Seas (AKG -28-4300). Herein, Shell describes possible changes and clarifications to the EMP requirement as described in the draft G GP, including alternative methods that may be used for producing the relevant information. The response is specific to the EMP requirements as indicated in Section II. A. 14 of the draft GGP.

EMP Phase I

Initial Site Physical Sea Bottom, Water-Column, and Air Characterization - This is intended to identify any potential sensitive biological areas, habitats, or historical properties, as well as understand the general topography of the seafloor to compare with any EMP Phase II observations. It is also intended to collect data on wind speed and direction at the site, as well as water column currents, temperature, salinity, turbidity, and depth.

Shell asserts this information can already be produced/compiled through a combination of:

1) Geophysical surveys that industry will already be performing.

As discussed in Shell's response to EPA Question #7, in which we represented the current anticipated process for pre -site characterization of proposed borehole locations, offshore geotechnical o perators review existing geophysical data and clear proposed geotechnical borehole sites prior to mobilization.

2) Scientific information available from past or ongoing studies that have been and /or are being performed in the Chukchi and Beaufort Seas.

Several environmental science studies have recently occurred or are currently occurring in the nearshore and coastal Chukchi Sea including, but not limited to: (i) The Arctic Ecosystem Integrated Survey (Eis), a project funded with qualified outer continent al shelf oil and gas revenues by the Coastal Impact Assistance Program, U.S. Fish and Wildlife Service, and U.S. Department of the Interior; this study is in progress. (ii) the Alaska Monitoring and Assessment Program (AKMAP) project whose goal is to asse ss the benthic and water quality and ecological status of waters of the northeastern Chukchi Sea from Pt. Hope to Barrow in waters 10 -50 meters in depth. Findings are anticipated to be available by late 2014; (iii) the Arctic Coastal Ecosystem Study (ACES) conducted by the North Slope Borough, and (iv) various industry-funded work both offshore (the Chukchi Sea Environmental Studies Program) as well as Shell - specific (the Shell Onshore Survey Program). Results from these programs, and others, are currently being compiled and synthesized by PacMARS (the Pacific Marine Arctic Regional Synthesis) and a complementary and longer-term initiative called SOAR (the Synthesis of Arctic Research).

3) Other publically available meteorological -oceanographic data (e.g., fro m the National Oceanic and Atmospheric Administration and the Bureau of Ocean Energy Management).

For example, Professor Tom Weingartner, University of Alaska Fairbanks, is currently leading an effort to characterize the Circulation on the Continental She lf Areas of the Northeast Chukchi and Western Beaufort Seas, (BOEM Cooperative Agreement #M12AC000008). Field data, including sea surface temperature, current direction, and turbidity are being collected from drifter buoys, moored meteorological buoys, a network of shore-based high-frequency radars, high resolution shipboard surveys, instrumented autonomous gliders, and other mooring operations.

Shell believes this base of knowledge and information can be utilized by the permitee in preparing a notice of intent (NOI) and that the EPA will be able to determine that it is sufficient for meeting the goals and objectives of the EMP Phase I such that there will be no need to "re -collect" the data prior to conducting a geotechnical borehole. EPA may also conclu de that once the findings of these prior studies are submitted by a permittee with an initial NOI, that the requirement is met for all future NOIs within the same general area(s). In either case, it is requested that EPA revise the draft GGP for geotechnical surveys requirement to state that these processes and data can be supplied to the agency as part of the NOI to satisfy this requirement.

EMP Phase II. Discharge 009 Plume Observations

This monitoring is intended to collect information on potential marine mammal deflections. Initially, it appears there was some confusion about whether any in -the-ocean "plume" monitoring was needed, such as monitoring of the temperature plume . During our March 26 th meeting, it was clarified that such monitoring is not needed. However, the language in the draft GGP, (page 20 Objective (4) and page 21 (e)); is still not clear and somewhat conflicting, and Shell understands that EPA appeared to recognize some issues in that area.

Marine mammal monitoring during offshore activities in the Beaufort or Chukchi Seas is stipulated by the agencies entrusted to protect marine mammals (e.g., National Marine Fisheries Service [NMFS] and U.S. Fish & Wildlife Servic e) to holders of marine mammal incidental take authorizations . Further, BOEM will require permittees conducting geotechnical investigations to show proof of authorization for incidental take of marine mammals. Since marine mammal monitoring is required within NMFS and USFWS authorizations and this monitoring will be continuous regardless of the operations being conducted during the performance of geotechnical investigations Shell respectfully asks the EPA rely on proof that NMFS and USFWS have issued their respective authorizations by requiring the applicant to provide copies of the authorizations prior to final authorization of NOIs to discharge. EPA does not need to specify monitoring for marine mammals during any discharges, since it is already stipulat ed to be underway regardless.

EMP Phase II. Physical Sea Bottom Characterization

This monitoring is intended to provide both a physical and visual characterization of the sea bottom following cessation of the geotechnical activities, including mapping the extent and depth/thickness of solids deposition from Discharge 001. Although monitoring is only required if drilling fluids are used, this requirement is very difficult to comply with because, as discussed in our responses to Geotechnical Related Activities (EPA Questions #4 and 5) and Pre-Testing/Pre-Certification of Drilling Fluid/Mud Formulation (EPA Questions #1, 3 and 5), the use of drilling fluid additives, while not expected for most of the geotechnical boreholes, will not be known with certainty in advance of drilling activities. Given this, and in order to comply with this requirement, geotechnical operators must then plan to conduct post-activity monitoring at each borehole regardless - even in the event *"de minimus"* amounts of drilling fluid are used.

The Ocean Discharge Criteria Evaluation (ODCE) concludes that the seafloor deposition of materials from Discharge 001 is so small (several millimeters at most), that it is not sufficient to cause harm to the benthos or other biology, does not elevate the contaminant concentrations in the sediments, and does not generate a source of bioavailable contaminants. The information provided by John Trefry during the March 26th meeting with EPA further demonstrated that the drilling muds will not alter the surface sediment metals concentrations, even at the locations with the most deposition, because what is added has no higher metals concentrations than the native sediments. There should therefore not be a need to attempt to visually document the deposition. If this is to remain an EMP requirement, then EPA should better describe why it is important, and how the data are to be used, considering their conclusion in the ODCE that the these discharges will not cause any harm to the seafloor.

Furthermore, visual (e.g., with cameras on an Sediment Profile Imaging instrument or Remotely Operated Vehicle) observation are not likely to be sensitive enough to reliably document the very little deposition, and subtle changes in the deposition, with visual techniques.

Predictive numerical modeling is available should such documentation be needed, and can be used as a more reliable approach to assess the dispersion and distribution of the discharges. We respectfully recommend to the EPA that they modify language to the EMP requirements that in lieu of using data collected under the exploration permit or collecting new data, the permittee can summarize existing regional data and the results of predictive numerical modeling submitted as part of the NOI. See Attachment A for recommended changes.

Attachment A.

Shell recommends changes to the content of the draft GGP, Section II.A.14, the requirements of the Environmental Monitoring Program (EMP). These changes are shown via "red-line" strike -out and insertion of "red-line" language throughout the following text excerpted from the draft GGP.

Recommended Changes to Section II.A.14 of draft GGP No. AKG-28-4300

Environmental Monitoring Program. The permittee must design and imple ment an environmental monitoring program (EMP) for geotechnical surveys and/or related activities. The permittee must design and implement the EMP that includes, if applicable, the following phases:

- Phase I – Baseline Site Characterization; may be required at each geotechnical ~~activity site~~area of operations, if not already conducted or met by the inclusion of previously collected baseline environmental data provided by the permittee at the time of filing a NOI to discharge under this general permit.
- Phase II – Post-Geotechnical Activity; required ~~if water-based drilling fluids will be used to conduct the geotechnical activity, or~~ if the Director requests completion of Phase II upon review of site -specific data. Unless otherwise specified by the Direct or, a Phase II analysis is not required if: (1) the geotechnical activities are located within the lease blocks whereby an EMP has been previously conducted pursuant to the 2012 Beaufort & Chukchi Exploration NPDES General Permits (AKG -28-2100 and AKG -28-8100); (2) the permitte e has established to the satisfaction of the Director sufficient existing baseline site characterization data and depositional modeling information; or (~~2~~3) the permittee is not using water-based drilling fluids.

The EMP shall meet the following goals, objectives and other requirements.

a. Goals

1. evaluate potential impacts of water -based drilling fluids and drill cuttings associated with geotechnical surveys and/or related activities on the marine environment; and

2. protect the marine environment; and

3. collect data during this permit term for use in future permit developments.

b. Objectives

1. complete baseline site characterization, including physical sea bottom survey, to ensure the authorized discharges do not occur on or near a sensitive biological area or habitat;

2. ensure that the geotechnical survey locations do not occur in the vicinity of potential historic properties;

3. evaluate areal effects of solids deposition associated with Discharge 001 at the seafloor~~; and~~

~~4. evaluate the plume(s) in the vicinity of Discharge 009.~~

c. Plan of Study. The applicant must submit an EMP Plan of Study to the Director for review with the first-time NOI ~~and the annual NOI renewal~~. The Plan of Study must include the permittee's EMP scope of work. The applicant must incorporate any changes to the EMP Plan of Study required by the Director, which will be included in the discharge authorization letter. The EMP must address the EMP goals, objectives and main components. A Plan of Study must include the following:

1. the EMP goals, objectives and phases discussed in Sections II.A.14.a.-c.;

2. each element of the EMP, pursuant to Sections II.A.14.e.-f.;

3. all monitoring procedures and methods;

4. a quality assurance project plan (see Section IV.A.);

5. a detailed discussion of how data will be used to meet, test, and evaluate the EMP objectives; and

6. a summary of results from previous environmental monitoring studies at the geotechnical activity site that are relevant to the EMP goals and objectives.

d. Phase I Assessment.

1. Initial Site Physical Sea Bottom Survey. If not already conducted, or met by the inclusion of existing environmental baseline data provided by the permittee at the time of NOI submittal or a prior NOI submittal in the same general area of past operations, ~~C~~conduct an assessment of the physical sea bottom before initiating discharges authorized by the general permit to ensure the geotechnical activity site is not located in or near a sensitive biological area, habitat, or historic properties. The survey should provide both a physical and visual characterization of the seafloor. If the proposed initial site is located in or near a sensitive biological area, habitat, or in the vicinity of historic properties, the permittee must report the information to the Director in accordance with Section II.A.14.g.1.

2. Physical Characteristics. If not already provided at the time of NOI submittal sufficient to characterize representative site conditions, or a prior NOI submittal in the same general area of past operations, ~~C~~collect physical data to characterize the conditions of the geotechnical activity site and receiving waters. These physical data include surface wind speed and direction, current speed and direction throughout the water column, water temperature, salinity, depth, and turbidity.

e. Phase II Assessment.

~~1. Discharge 009 (non-contact cooling water) Plume Observations. The permittee must collect observations for potential marine mammal deflection during periods of discharge.~~

1. ~~2.~~ Physical Sea Bottom Survey. If the Director decides that predictive numerical modeling results are not sufficient to discern what post-activity conditions from Discharge 001 would be, then ~~C~~conduct a physical sea bottom survey ~~immediately~~ within one year following cessation of geotechnical activities ~~at the site~~in the area of operations. The physical sea bottom survey should provide both a physical and visual characterization of the seafloor to ~~assess~~ determine

representative post-activity conditions in the geotechnical ~~activity site conditionarea~~ of operations. The survey ~~must~~ should attempt to map the areal extent and depth/thickness of solids deposition caused by Discharge 001 ~~and depict any potential overlap from deposition caused by nea rby exploration activities~~.

f. EMP Reports. The permittee must submit an annual EMP report to the Director.

1. The permittee must notify the Director, in writing, 7 calendar days from receipt of the physical sea bottom survey data, if the data indicates th e proposed geotechnical activity is located in or near a sensitive biological area, habitat, or in the vicinity of historic properties. The notification described in this paragraph must be signed in accordance with the Signatory Requirements (Section VI.E.) of this general permit.

2. The permittee must submit the EMP report ~~with the annual NOI renewal or~~ within 1 year of completing geotechnical surveys, or Physical Sea Bottom Survey under (e) ~~2~~1 above if conducted after the completion of geotechnical surveys, and/or related activities~~, whichever comes first~~. The EMP report must contain the following information:

i. summary of the results for each phase of environmental monitoring;

ii. discussion of how the EMP goals and objectives were accomplished;

iii. analytical test methods used for data analysis;

iv. description of any observed impacts of the effluent on the physical characteristics of the receiving water environment;

v. description of the data, evaluations and determinations with regard to each EMP phase; and

vi. all relevant quality assurance/quality control information including, but not limited to, laboratory instrumentation, laboratory procedures, analytical method detection limits, analytical method precision requirements, and sample collection methodology.

3. If the Director requires revisions to the EMP report, the permittee must complete the revisions and submit a revised report to the Director within 60 days of the date of the request or within the time period identified by the Director, whichever time period is longer.

g. Implementation and Modification. The EMP may be modified if the Director determines that the modification is appropriate. Modifications to the EMP may include changes in sampling location, changes in sample frequency, or changes to parameters to be monitored. This determination will be made by the Director upon receipt of the first -time NOI ~~and/or annual NOI renewal package~~ and upon review of the findings reported in t he EMP report prepared after completion of authorized geotechnical activit y discharges.